

CLAIMS:

1. A method of controlling the current condition of a reticle, the method comprising: processing and analyzing test data indicative of a test pattern produced on an article using the reticle when in the current condition, and reference data
5 indicative of a reference pattern previously produced on an identical reference article using said reticle when considered to be of a satisfied condition, and generating output data indicative of the current condition of said reticle.
2. The method of Claim 1, wherein said processing and analyzing includes processing at least one of the reference and test data to obtain optimized data
10 indicative of the pattern substantially free of effects caused by defects other than those caused by said reticle.
3. The method of Claim 2, wherein said effects, caused by the defects other than those caused by the reticle, are identified as effects randomly appearing in the pattern-indicative data.
- 15 4. The method of Claim 1, wherein said test pattern is produced on a test article having a layer material structure identical to that of the reference article.
5. The method of Claim 1, wherein the reference pattern and the test pattern are produced on different areas of the same reference article.
6. The method of Claim 1, wherein the reference pattern and the test pattern are
20 produced in, respectively, reference and test areas each having a single-layer structure.
7. The method of Claim 1, wherein the reference pattern and the test pattern are produced in, respectively, reference and test areas, each having a multi-layer stack structure.
- 25 8. The method of Claim 1, wherein the data indicative of the pattern is obtained using bright field inspection of at least a portion of the pattern.
9. The method of Claim 1, wherein the data indicative of the pattern is obtained using dark field inspection of at least a portion of the pattern.

10. The method of Claim 1, wherein the data indicative of the pattern is obtained using inspection at least a portion of the pattern with a charged particles beam.
11. The method of Claim 1, wherein the data indicative of the pattern is obtained by applying optical critical dimension measurements to at least a portion of the pattern.
12. The method of Claim 1, wherein the data indicative of the pattern includes several similar, periodically appearing, pattern features.
13. The method of Claim 12, comprising applying image processing to the data indicative of the pattern to correct for defects in an image of the pattern feature.
14. The method of Claim 13, wherein said correcting comprises dividing the image of the defective pattern feature into image parts and replacing the defective image part by a corresponding image part of an image of another pattern feature.
15. The method of Claim 1, comprising, upon obtaining the reference data, storing the reference data to be used later one for the data processing analyzing when controlling of the current condition of the reticle is needed.
16. The method of Claim 1, comprising, upon producing the reference pattern, storing the reference pattern to be used later one to provide said reference data when controlling of the current condition of the reticle is needed.
17. The method of Claim 1, for controlling the condition of the reticle after an etching stage of a lithography process.
18. The method of Claim 1, for controlling the condition of the reticle prior to carrying out an etching stage of a lithography process.
19. The method of Claim 1, for controlling the reticle used for semiconductor wafers production.
20. The method of Claim 19, wherein the pattern is produced on a bare wafer.
21. The method of Claim 19, wherein the test pattern is produced on a wafer having a layer material structure similar to that of the production wafer.
22. The method of Claim 19, wherein said test pattern is produced on the production wafer.

23. The method of Claim 19, wherein the data indicative of the pattern is indicative of an image of several dies on the wafer.
24. The method of Claim 23, comprising die-to-die image processing.
25. The method of Claim 23, comprising applying image processing to correct for
5 defects in the die image.
26. The method of Claim 25, wherein said correcting comprises dividing the image of the defective die into image parts and replacing the defective image part by a corresponding image part of another die image.
27. The method of Claim 19, comprising, upon providing the reference data,
10 storing said reference data to be used later on for the data processing and analyzing when controlling the current condition of the reticle is needed.
28. The method of Claim 19, comprising, upon producing the reference pattern, storing said reference pattern to be used later on to provide said reference data when controlling the current condition of the reticle is needed.
- 15 29. A method of controlling the condition of a reticle, the method comprising:
- using said reticle when in a satisfied quality condition thereof to produce a reference pattern on an article, and using said reticle when in a current condition thereof a certain time period thereafter, to produce a test pattern on the identical article;
 - 20 - providing first measured data indicative of the reference pattern and providing a second measured data indicative of the test pattern, and
 - analyzing the first and second measured data to generate output data indicative of the current condition of said reticle.
30. A method of controlling the condition of a reticle, the method comprising:
- 25 - inspecting a reference pattern, produced on an article using the reticle to be controlled when considered to be of a satisfied condition, said inspecting comprising exposing at least a portion of the reference pattern to incident radiation and obtaining first measured data indicative of the radiation response of said at least portion of the pattern;

- selectively controlling a current condition of said reticle a certain time period after the production of the reference pattern, said controlling comprising using said reticle to produce a test pattern on an identical article, exposing at least a portion of said test pattern to said incident radiation and obtaining second measured data indicative of the radiation response of said at least portion of the test pattern;
- analyzing the first and second measured data to generate output data indicative of the current quality condition of said reticle.

31. A system for use in controlling the condition of a reticle, the system comprising:

- (a) a measuring unit configured for irradiating at least a portion of a patterned article, detecting a radiation response of the sample, and obtaining measured data indicative thereof;
- (b) a control unit configured for data communication with the measuring unit, so as to be responsive to the measured data indicative of the radiation response of the article corresponding to a current condition of said reticle, to analyze said measured data using certain reference data, and generate output data indicative of the data analysis results, said reference data being indicative of the radiation response of at least a portion of a reference pattern produced on an identical article using said reticle, when considered to be of a satisfied condition.

32. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps of controlling the current condition of a reticle, the method comprising: processing and analyzing test data indicative of a test pattern, produced by the reticle when in the current condition on an article, and reference data indicative a reference pattern previously produced on an identical article by using said reticle, when considered to be of a satisfied condition, and generating output data indicative of the current condition of said reticle.

33. A computer program product comprising a computer useable medium having computer readable program code embodied therein of controlling the current condition of a reticle, the computer program product comprising a data processing entity for processing and analyzing data indicative of a test pattern, produced by the
5 reticle when in the current condition on an article, and data indicative of a reference pattern previously produced on a similar article by using said reticle, when considered to be of a satisfied condition, and generating output data indicative of the current quality condition of said reticle.